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E GUICHERIT/AU

L1 48 S E11-13,E15
L2 22 S L1 AND(INDIRECT OR OZONE OR CHEMILUMINES?)
L3 11 S L2 AND(DETECT? OR DETERMIN? OR MEASUR? OR MONITOR? OR TEST?)
E COX R/AU
L4 366 S E3-5
E COX RI/AU
L5 55 S E4-5,E7
E JONES R/AU
L6 686 S E3
E JONES R L/AU
L7 381 S E3-4
E JONES ROD/AU
L8 23 S E3-4,E6-7,E12
L9 23 S L4-5 AND L6-8
L10 150 S L4-8 AND(OZONE OR O3 OR NO2 OR NOX OR(NITROGEN OR NITRIC OR
NITROUS) (1A) (OXIDE OR DIOXIDE))
L11 108 S L10 AND(DETECT? OR DETERMIN? OR MEASUR? OR MONITOR? OR TEST?)
L12 34551 S (NO2 OR NOX OR(NITROGEN OR NITRIC OR NITROUS) (1A) (OXIDE OR
DIOXIDE)) (6A) (DETECT? OR DETERMIN? OR MEASUR? OR MONITOR? OR TEST? OR
ASSAY? OR ANALY? OR ASSES? OR ESTIMAT? OR EVALUAT? OR EXAMIN? OR
SENSE# OR SENSING OR QUANTITAT? OR QUANTIF?)
L13 3712 S L12 AND(OZONE OR O3)
L14 17221 S (OZONE OR O3) (6A) (DETECT? OR DETERMIN? OR MEASUR? OR MONITOR? OR
TEST? OR ASSAY? OR ANALY? OR ASSES? OR ESTIMAT? OR EVALUAT? OR EXAMIN?
OR SENSE# OR SENSING OR QUANTITAT? OR QUANTIF?)
L15 4144 S L14 AND(NO2 OR NOX OR(NITROGEN OR NITRIC OR NITROUS) (1A) (OXIDE OR
DIOXIDE))
L16 396 S L13,L15 AND CHEMILUMIN?
L17 92 S L13,L15 AND (PHOTOLY? OR IRRADIAT?) AND(UV OR ULTRAVIOLET OR ULTRA
VIOLET)
L18 43 S L16 AND (UV OR ULTRAVIOLET OR ULTRA VIOLET)
L19 90 S L13,L15 AND EQUILIB?
L20 369 S L1,L9,L11,L17-19
L21 320 S L20 NOT PY>1999
L22 4 S L20 NOT L21 AND PATENT/DT
L23 13 S L20 NOT L21 NOT PY>2000
L24 1 S L23 AND SLOPE96
L25 325 S L21-22,L24

=> d bib,ab 1-325 125

L25 ANSWER 13 OF 325 CA COPYRIGHT 2003 ACS

AN 131:247413 CA

TI The UV-visible absorption cross-sections and atmospheric photolysis rate of
HOI

AU Rowley, David M.; Mossinger, Juliane C.; Cox, R. Anthony; Jones, Roderic L.
CS Department of Chemistry, Christopher Ingold Laboratories, University
College London, London, WC1H 0AJ, UK

SO Journal of Atmospheric Chemistry (1999), 34(1), 137-151

AB The UV-visible absorption cross-sections of HOI have been recorded over the
wavelength range 278-494 nm and at 298 K following generation of HOI in the
gas phase using laser flash photolysis. The gas phase reaction of OH with
I2 was used to produce HOI, and the absorption spectrum of HOI was

calibrated relative to the consumption of I₂. The HOI spectrum recorded exhibits 2 broad absorption maxima of $\sigma = 3.99 \times 10^{-19} \text{ cm}^2$ and $\sigma = 2.85 \times 10^{-19} \text{ cm}^2$, centered at 338.4 nm and 404.8 nm resp. The spectrum is adequately described by a parameterization consisting of two semi-logarithmic Gaussian distribution functions. The HOI spectrum is more intense than that recorded in previous work of Jenkin, but is in good agreement with more recent work by Bauer et al. The parameterized HOI absorption spectrum recorded in this work was used in a radiative model to calc. the atm. photolysis rate (J-value) of HOI. These results indicate that, under most sunlit conditions, HOI has a lifetime with respect to solar photolysis of the order of minutes. Expts. attempting to generate HOI by the reaction of O atoms with C₂H₅I led to complex absorption spectra contg. a neg. contribution to the absorption from the photolytic removal of an unidentified species. In addn., evidence was found for adsorption and desorption of an iodine-contg. species in the reaction vessel. This behavior is rationalized in terms of the disproportionation of HOI to I₂O, and an uncalibrated spectrum tentatively attributed to I₂O has been recorded.

L25 ANSWER 14 OF 325 CA COPYRIGHT 2003 ACS

AN 131:247325 CA

TI NO₂ → NO + O(3P) **photolysis** frequencies **determined** from spectroradiometric measurements of solar actinic UV radiation: comparison with chemical actinometer measurements

AU Kraus, A.; Bruning, D.; Hofzumahaus, A.; Rohrer, F.

CS Institut für Atmosphärische Chemie ICG3, Forschungszentrum Jülich GmbH, Jülich, D-52425, Germany

SO Proceedings of EUROTRAC Symposium '98: Transport and Chemical Transformation in the Troposphere, Garmisch-Partenkirchen, Germany, Mar. 23-27, 1998 (1999), Meeting Date 1998, Volume 1, 74-78. Editor(s): Borrell, Patricia M.; Borrell, Peter. Publisher: WIT Press, Southampton, UK.

AB The actinic spectroradiometry method was developed to measure atm. **photolysis** frequencies of atm. trace gases like O₃ and NO₂. The complete system is characterized and calibrated in the lab., using calibrated W-halogen stds. A measurement intercomparison was performed between the actinic spectroradiometer and a chem. J(NO₂) actinometer in parallel on the roof of the institute building. The calibration of the actinometer is performed using a certified mixt. of NO in synthetic air, the abs. accuracy of the actinometric J(NO₂) **detn.** is **estd.** to ±7%. For the intercomparison, only the down-welling radiation (2π sr) was detected. The data sets tracked each other very well with a small systematic difference in the abs. magnitude of J(NO₂). The remaining uncertainty in J(NO₂) was **estd.** to ±5%.

L25 ANSWER 18 OF 325 CA COPYRIGHT 2003 ACS

AN 131:77485 CA

TI C2-C5 hydrocarbon measurements in the Netherlands 1981-1991

AU Roemer, Michiel; Builtjes, Peter; Esser, Paul; Guicherit, Rob; Thijssen, Tom

CS TNO Institute of Environment Sciences, Delft, 2600 JA, Neth.

SO Atmospheric Environment (1999), 33(22), 3579-3595

AB Measurements of C2-5 hydrocarbons on an hourly basis at the TNO site in Delft from 1982 to 1984 and at Moerdijk (Netherlands) from 1981 to 1991 are presented. In combination with meteorol. data (wind direction and speed), the Delft and Moerdijk series were evaluated to identify source categories, annual variations, background concns., and trends. C2-5 hydrocarbon concns. at Delft and Moerdijk were detd. mainly by emission characteristics and meteorol. dispersion; dominant sources are relatively nearby and atm. degrdn. is not of much importance. Under high wind speed conditions,

concns. measured at Moerdijk in the marine sector were close to Atlantic background concns. in winter and somewhat above this in summer. Continental background concns. were higher than marine background concns. by a factor of nearly 2. The annual variation of acetylene was more pronounced than that of other hydrocarbons, most likely due to a different seasonal variation in acetylene emissions. The annual variation of propene was smoother, indicating stronger sources in summer than in winter. This feature of propene was obsd. in continental and marine sectors. Observations showed that at Moerdijk C2-4 concns. measured in the Rijnmond sector decreased considerably since the early 1980s, corresponding with emission changes in that area. Averaged over all wind directions, the trend of all species was downward, but for acetylene, the trend is significant at a 95% confidence interval. Acetylene concns. showed an annual downward trend of 3% in the 1980s, supporting other ests. of decreasing hydrocarbon emissions from traffic over this period at the same rate.

L25 ANSWER 23 OF 325 CA COPYRIGHT 2003 ACS

AN 130:300687 CA

TI Slant column **measurements** of **O3** and **NO2** during the NDSC intercomparison of Zenith-Sky UV-visible spectrometers in June 1996

AU Roscoe, H. K.; Johnston, P. V.; Van Roozendaal, M.; Richter, A.; Sarkissian, A.; Roscoe, J.; Preston, K. E.; Lambert, J-C.; Hermans, C.; Decuyper, W.; Dzienus, S.; Winterrath, T.; Burrows, J.; Goutail, F.; Pommereau, J-P.; D'Almeida, E.; Hottier, J.; Coureul, C.; Didier, R.; Pundt, I.; Bartlett, L. M.; McElroy, C. T.; Kerr, J. E.; Elokhov, A.; Giovanelli, G.; Premuda, M.; Kostadinov, I.; Erle, F.; Wagner, T.; Pfeilsticker, K.; Kenntner, M.; Marquard, L. C.; Gil, M.; Puentedura, O.; Yela, M.; Arlander, D. W.; Kastad Hoiskar, B. A.; Tellefsen, C. W.; Tornkvist, K. Karlsen; Heese, B.; Jones, R. L.; Aliwell, S. R.; Freshwater, R. A.

CS British Antarctic Survey/NERC, Cambridge, CB3 OET, UK

SO Journal of Atmospheric Chemistry (1999), 32(2), 281-314

AB In June 1996, 16 UV-visible sensors from 11 institutes **measured** spectra of the zenith sky for more than 10 days. Spectra were analyzed in real-time to **det.** slant column amts. of **O3** and **NO2**. Spectra of Hg lamps and lasers were **measured**, and the amt. of **NO2** in a cell was **detd.** by each spectrometer. Some spectra were re-analyzed after obvious errors were found. Slant columns were compared in two ways: by examg. regression analyses against comparison instruments over the whole range of solar zenith angles; and by taking fractional differences from a comparison instrument at solar zenith angles between 85° and 91°. Regression identified which pairs of instruments were most consistent, and so which could be used as universal comparison instruments. For **O3**, regression slopes for the whole campaign agreed within 5% for most instruments despite the use of different cross-sections and wavelength intervals, whereas similar agreement was only achieved for **NO2** when the same cross-sections and wavelength intervals were used and only one half-day's data was analyzed. Mean fractional differences in **NO2** from a comparison instrument fall within 7% (1-sigma) for most instruments, with std. deviations of the mean differences averaging 4.5%. Mean differences in **O3** fall within 2.5% (1-sigma) for most instruments, with std. deviations of the mean differences averaging 2%. **Measurements** of **NO2** in the cell had similar agreement to **measurements** of **NO2** in the atm., but for some instruments **measurements** with cell and atm. relative to a comparison instrument disagreed by more than the error bars.

L25 ANSWER 29 OF 325 CA COPYRIGHT 2003 ACS

AN 130:186317 CA
TI Field **measurements** of atmospheric **photolysis** frequencies for O₃, NO₂, HCHO, CH₃CHO, H₂O₂, and HONO by UV spectroradiometry
AU Kraus, A.; Hofzumahaus, A.
CS Forschungszentrum Julich GmbH, Institut fur Atmospharische Chemie, Julich, D-52425, Germany
SO Journal of Atmospheric Chemistry (1998), 31(1-2), 161-180
AB A calibrated spectroradiometer was used for the measurement of spectra of the abs. actinic flux $F\lambda(\lambda)$ during the POPCORN field campaign in Pennewitt (53.8° N, 11.7° E, sea level) in August 1994. The obtained set of actinic flux spectra was used to **det.** the **photolysis** frequencies J(O₁D), J(NO₂), J(HCHO), J(H₂O₂), J(HONO), and J(CH₃CHO), using mol. photodissocn. data from literature. The accuracy of the actinic flux measurement was about ±5%. The accuracy of the **photolysis** frequency detn. is limited by the uncertainties of the mol. absorption cross section and quantum yield data. A good agreement within the exptl. uncertainties was found in comparison with **measurements** of J(O₁D) and J(NO₂) by filter radiometer which were calibrated absolutely against chem. actinometer. A comparison of this work's **photolysis** frequency measurements at 40° solar zenith angle with resp. measured and modeled data from the literature also shows good agreement for most of the processes considered in this work. However, in the case of J(NO₂) data reported in the literature as a function of solar zenith angle differences up to a factor of 1.6 with respect to this work's J(NO₂) data are obsd. Since this is far beyond the estd. exptl. uncertainties, other atm. variables, such as aerosols, seem to affect J(NO₂) to an extent that is underestimated by now and make indirect comparisons of J(NO₂) **measurements** difficult.

(L25) ANSWER 40 OF 325 CA COPYRIGHT 2003 ACS

AN 128:234381 CA
TI **Measurements** of tropospheric NO₃ at midlatitude
AU Aliwell, S. R.; Jones, R. L.
CS Centre for Atmospheric Science, University of Cambridge, Cambridge, UK
SO Journal of Geophysical Research, [Atmospheres] (1998), 103(D5), 5719-5727
AB The column abundance of NO₃ has been **measured** through sunrise at the midlatitude site at Cambridge, England (52.2°N, 0.1°E), using zenith sky visible absorption spectroscopy. This technique allows distinction between the tropospheric and stratospheric components of the total NO₃ vertical column during sunrise. **Measurements** of the tropospheric component during July to Oct. 1995 are presented and show an av. concn. of 89 ppt if it is assumed that all tropospheric NO₃ is present in a 1-km thick atm. boundary layer. The day to day variability is considerable. The NO₃ **measurements** together with point **measurements** of O₃, NO₂, NO and temp. show that the NO₃ lifetime is significantly longer than reported in other studies. The very short lifetime expected as a result of the **measured** levels of NO suggests that the ground level **measurements** of O₃, NO₂ and NO are not representative of the whole boundary layer and therefore that the NO₃ lifetime at the surface is not representative of the av. boundary layer lifetime. Idealized model calcns. confirm that a gradient in NO₃ concn. would be expected in the boundary layer as a result of the different timescales for mixing and reaction with NO in a stable nocturnal situation. Any other rapid loss reaction near the surface for example, with di-Me sulfide in the marine environment or isoprene at a wooded rural site, may have a similar effect. Such high concns. of NO₃ may alter balance toward significant nighttime oxidn. of hydrocarbons either directly or by prodn. of OH.

(L25) ANSWER 42 OF 325 CA COPYRIGHT 2003 ACS

AN 128:158087 CA

TI A broadband lidar for the **measurement** of tropospheric constituent profiles from the ground
 AU Povey, I. M.; South, A. M.; De Roodenbeke, A. T'kint; Hill, C.; Freshwater, R. A.; **Jones, R. L.**
 CS Centre for Atmospheric Science, University of Cambridge, Cambridge, UK
 SO Journal of Geophysical Research, [Atmospheres] (1998), 103(D3), 3369-3380
 AB In this paper we describe a novel lidar that combines differential UV-visible absorption spectroscopy and the lidar technique. The crit. and novel element of the system is the use of an imaging spectrometer in conjunction with a two-dimensional CCD **detector** array to simultaneously spectrally and temporally resolve backscattered radiation. To exploit this approach, the lidar system utilizes a broadband laser output of 10-20 nm full width at half max. tunable across the UV-visible spectral region, thus allowing the simultaneous **measurement** of multiple mol. species by the differential optical absorption spectroscopy technique. To demonstrate the flexibility of the technique for tropospheric compn. **monitoring** we present initial results for both elastic and inelastic (Raman) backscatter and for adsorption studies in the spectral regions where NO₃ and H₂O absorb. In addn., the technique has applicability for a wide range of mols. including **O₃, NO₂**, and other spectrally structured absorbers and for atm. temp. sounding, which may be derived from either rotational Raman return or temp. dependent absorptions such as those of O₂.

L25 ANSWER 45 OF 325 CA COPYRIGHT 2003 ACS
 AN 128:120024 CA
 TI Kinetics and Mechanism of the BrO Self-Reaction: Temperature- and Pressure-Dependent Studies
 AU Harwood, Matthew H.; Rowley, David M.; **Cox, R. Anthony; Jones, Roderic L.**
 CS Centre for Atmospheric Science, University Chemical Laboratory, Cambridge, CB2 1EW, UK
 SO Journal of Physical Chemistry A (1998), 102(10), 1790-1802
 AB The flash photolysis/UV absorption technique has been used to study the self-reaction of BrO radicals over the temp. range 222-298 K and the pressure range 100-760 Torr of N₂ or O₂. Two chem. sources of BrO radicals were used: photolysis of Br₂ in the presence of excess **ozone** and photolysis of O₂ in the presence of excess Br₂. The overall rate const., k₁, for the BrO self-reaction (defined by $-d[\text{BrO}]/dt = 2k_1[\text{BrO}]^2$) was found to be temp. and pressure independent at T ≥ 250 K, with $k_1 = (2.88 \pm 0.20) \times 10^{-12} \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$. At temps. below 250 K, k₁ was found to be pressure dependent, due to the emergence of a new termol. channel of the BrO self-reaction 1c, -1c forming the BrO dimer, Br₂O₂ (BrO + BrO + M \rightarrow Br₂O₂ + M). Channel-specific rate consts. were **detd.** for the two bimol. channels of the BrO self-reaction above 250 K, giving for (1a) (BrO + BrO \rightarrow 2Br + O₂) $k_{1a} = (5.31 \pm 1.17) \times 10^{-12} \exp\{(-211 \pm 59)/T\} \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ and for (1b) (BrO + BrO \rightarrow Br₂ + O₂) $k_{1b} = (1.13 \pm 0.47) \times 10^{-14} \exp\{(983 \pm 111)/T\} \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$. Below 250 K, the overall rate coeff. of the two bimol. channels is reduced as the dimer forming channel emerges. At 235 and 222 K, rate consts. for the formation (k_{1c}) and decompn. (k_{-1c}) of Br₂O₂ were recorded. Using the values for K_{1c}, ΔH_r for reaction 1c was estd. as $-58.6 \pm 0.1 \text{ kJ mol}^{-1}$. A UV absorption spectrum attributed to Br₂O₂ was also recorded over the wavelength range 300-390 nm. The cross section of the smooth Br₂O₂ spectrum was found to be $1.2 \times 10^{-17} \text{ cm}^2 \text{ mol}^{-1}$ at 320 nm. These results are rationalized in terms of a mechanism of the BrO self-reaction that shows competition, at low temps., between collisional quenching and unimol. disocn. of an excited BrOOBr* intermediate. The rate const. for the reaction of oxygen atoms with mol. bromine was also **detd.** in the course of these expts. [O + Br₂ \rightarrow BrO + Br (5)], giving $k_5 = (5.12 \pm 1.86) \times 10^{-13} \exp\{(989 \pm 91)/T\} \text{ cm}^3 \text{ mol}^{-1} \text{ s}^{-1}$. All errors are 1σ. The atm. implications

of these results are discussed.

L25 ANSWER 47 OF 325 CA COPYRIGHT 2003 ACS

AN 128:65543 CA

TI Design of an environmental chamber for the study of atmospheric chemistry: new developments in the analytical device

AU Doussin, J. F.; Ritz, D.; Durand-Jolibois, R.; Monod, A.; Carlier, P.

CS Lab. Interuniversitaire Systemes Atmospheres (Lisa), Faculte Sci., Ura CNRS 1404 Univ. Paris 7, Creteil, Fr.

SO Analisis (1997), 25(7), 236-242

AB An indoor evacuable environmental chamber was built to study atm. chem. at Lisa, France. The photoreactor, a Pyrex tube, is equipped with an **irradn.** device to study photochem. reactions in the **UV** and visible ranges. A **UV-visible DOAS** and a long-path Fourier transform IR spectrometry device were designed to analyze trace components of reactional mixts. during atm. simulation expts. These facilities are unique and new developments were designed and performed in the analytic device to allow a very long path and high stability of the optical path. The entire app. is described and results of calibration expts. are given.

L25 ANSWER 52 OF 325 CA COPYRIGHT 2003 ACS

AN 127:335780 CA

TI A comparison of differential optical absorption spectrometers for **measurements** of **NO2**, **O3**, **SO2**, and **HONO**

AU Coe, H.; Jones, R. L.; Colin, R.; Carleer, M.; Harrison, R. M.; Peak, J.; Plane, J. M. C.; Smith, N.; Allan, B.; Clemetshaw, K. C.; Burgess, R. A.; Platt, U.; Etzkorn, T.; Stutz, J.; Pommereau, J. -P.; Goutail, F.; Nunes-Pinharanda, M.; Simon, P.; Hermans, C.; Vandaele, A. -C.

CS School of Environmental Sciences, University of East Anglia, Norwich, NR4 7TJ, UK

SO Proceedings of EUROTRAC Symposium '96: Transport and Transformation of Pollutants in the Troposphere, 4th, Garmisch-Partenkirchen, Germany, Mar. 25-29, 1996 (1997), Meeting Date 1996, Volume 2, 757-762. Editor(s): Borrell, Patricia M. Publisher: Computational Mechanics Publications, Southampton, UK.

AB This exercise composed of software **testing** using synthetic spectra, cell **measurements**, and ambient **measurement** alongside com. point **monitoring** equipment. For example, the results from the software application showed good agreement between the instruments.

L25 ANSWER 66 OF 325 CA COPYRIGHT 2003 ACS

AN 126:267750 CA

TI Development of 1000 series ambient air monitoring analyzers and AAMS-4000 series monitoring systems. I. FLAD-1000 sulfur dioxide **analyzer** CLAD-1000 **nitrogen oxide analyzer**, and UVAD-1000 **ozone analyzer**

AU Aki, Toshinobu; Namba, Hideaki; Nakajima, Kadzuyoshi; Mega, Akimasa; Seidoh, Akinori; Kozakura, Masaru; Sumi, Shingo; Nonaka, Takanori; Noda, Hiroshi

CS Process Environ. Instrum. Div., Shimadzu Corp., Kyoto, Japan

SO Shimadzu Hyoron (1997), 53(3/4), 241-255

LA Japanese

AB Five ambient air monitoring analyzers have been developed. This article details three 1000 Series **analyzers**: FLAD-1000 **SO2 analyzer**, CLAD-1000 **NOx analyzer**, and UVAD-1000 **O3 analyzer**. The **UV** fluorescence of FLAD-1000, chem. luminescence of CLAD-1000, and **UV** absorption methods of UVAD-1000 used in the three analyzers are all "dry", phys. methods. The methods, adopted in the three analyzers, have the advantages that the operation and maintenance are quite simple and easy, and that the data are

internationally compatible. This report also refers to the AAMS-4000 Series monitoring systems, which consists of some 1000 Series analyzers. The following article (II) will describe the other two analyzers: the URAD-1000 carbon monoxide analyzer and the BRAD-1000 suspended particulate matter analyzer. In this article, outline of signal data processing for the 1000 Series is also described.

L25 ANSWER 68 OF 325 CA COPYRIGHT 2003 ACS

AN 126:254581 CA

TI High-resolution **measurements** of the absorption cross-sections for **O3** and **NO2**

AU Jean, Brion; Chakir, A.; Coquart, B.; Daumont, D.; Jenouvrier, A.; Malicet, J.; Merienne, M.F.

CS U.A. D.1434 Spectrometrie Moleculaire et Atmospherique, U.F.R. Sciences, Reims, F-51062, Fr.

SO Transport and Chemical Transformation of Pollutants in the Troposphere (1997), Volume 3, 157-161. Editor(s): Le Bras, Georges. Publisher: Springer, Berlin, Germany.

AB Two objectives have been achieved during these last years: the **detn.** of the absorption cross-sections of **O3** and **NO2** in the **UV** and visible regions at different temps; and the construction of a modulated **photolysis** app. for the study of atm. reactions initiated by **photolysis**.

L25 ANSWER 79 OF 325 CA COPYRIGHT 2003 ACS

AN 125:255615 CA

TI A study of nighttime **nitrogen oxide** oxidation in a large reaction chamber - the fate of **NO2**, **N2O5**, **HNO3**, and **O3** at different humidities

AU Mentel, Th. F.; Bleilebens, D.; Wahner, a.

CS Inst. Atmosphaerische Chem., Forschungszentrum Juelich GmbH, Juelich, D-52425, Germany

SO Atmospheric Environment (1996), 30(23), 4007-4020

AB Inorg. reactions important for the nighttime chem. of **NOx** in surface air were studied. The expts. were performed in a new, large reaction chamber with a vol. of 260 m3 and a surface/vol. ratio better than 1/m. The inner surface of the chamber is Teflon FEP. The formation of **N2O5** and **HNO3** in ambient air with an initial content of ~1.3 ppm **NO2** and ~1.3 ppm **O3** was **monitored** at 8, 20, and 70% relative humidity for periods of ≤5 days. The mixing ratios of **NO2**, **N2O5**, and **HNO3** were **measured** simultaneously by in-chamber FTIR absorption spectroscopy. **O3** and **NO** were **measured** by **UV** absorption and **chemiluminescence**. Model calcns. for the **nitrogen oxide/ozone** system were performed. By comparison of the model calcns. with the exptl. data, the rate coeffs. of 2 slow reactions, the unimol. decompn. of **NO3** and the gas-phase formation of **HNO3** from **N2O5** and water were detd. An upper limit for the rate coeff. for the unimol. decompn. of **NO3** of $\leq 1.4 \times 10^{-4}/s$ was obtained, which corresponds to a lifetime of 120 min. The expts. provide evidence that the conversion of **N2O5** with gaseous water to gas-phase **HNO3** is a superposition of 2 slow processes: a 2nd-order reaction, **N2O5** + **H2O**, with a rate coeff. of $2.6(\pm 0.1) \times 10^{-22} \text{ cm}^3/\text{mol.}\cdot\text{s}$, and a 3rd-order reaction, 1st order in **N2O5** and 2nd order in **H2O**, with a rate coeff. of $2(\pm 0.05) \times 10^{-39} \text{ cm}^6/\text{mol.}^2\cdot\text{s}$. The 3rd-order process could be due to a reaction of **N2O5** with water on the chamber walls or alternatively to a gas-phase reaction, possibly even with water dimers. The implications of both alternatives for the atm. lifetime of **N2O5** with respect to its gas-phase conversion to **HNO3** are discussed.

~~L25~~ ANSWER 84 OF 325 CA COPYRIGHT 2003 ACS

AN 124:331069 CA

TI **Chemiluminescence** device for **measurement** of **nitrogen oxides**

IN Kozakura, Masaru
PA Shimadzu Corp, Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
PI JP 08082601 A2 19960326 JP 1994-218721 19940913
PRAI JP 1994-218721 19940913
AB The title device, suited for use in **detn.** of **nitrogen oxide** concn. in exiled gases from boiler and automobile, comprises a **UV** radiation cell to generate at. O by **ozone** decompn. of a reaction gas. The quantitation is based on the measurement of emission intensity due to the chem. reaction between sample gas and reaction gas in contacts. An **ozone** generator is disposed in reaction gas.

L25 ANSWER 94 OF 325 CA COPYRIGHT 2003 ACS
AN 123:240653 CA
TI A spectroscopic study of Cl₂O₃
AU Harwood, Matthew H.; Rowley, David M.; Freshwater, Reymond A.; Cox, R. Anthony; Jones, Roderic L.
CS Cent. Atmos. Sci., Univ. Chem. Lab., Cambridge, CB2 1EW, UK
SO Journal of the Chemical Society, Faraday Transactions (1995), 91(18), 3027-32
AB The UV absorption spectrum of dichlorine trioxide, Cl₂O₃ has been recorded in the wavelength range 220-340 nm and at 223 K using a recently developed flash photolysis-kinetic UV absorption spectroscopy app. Cl₂O₃ was generated in the reaction between ClO and OClO following the partial photolysis of OClO. The spectrum obtained is smooth, and shows a peak at 267 nm, where $\sigma = 1.76 \times 10^{-17} \text{ cm}^2 \text{ mol}^{-1}$ (base e). Results are broadly consistent with previous detns. of the spectrum, although we report higher cross-sections in the long-wavelength tail of the absorption. The discrepancies between these and previous measurements are discussed, together with the atm. implications of this work.

L25 ANSWER 151 OF 325 CA COPYRIGHT 2003 ACS
AN 112:63792 CA
TI Studies with nitryl hypochlorite: thermal dissociation rate and catalytic conversion to **nitric oxide** using an NO/O₃ chemiluminescence **detector**
AU Anderson, L. C.; Fahey, D. W.
CS Aeron. Lab., Natl., Oceanic Atmos. Adm., Boulder, CO, 80303, USA
SO Journal of Physical Chemistry (1990), 94(2), 644-52
AB A NO/O₃ chemiluminescence **detector** equipped with Au catalyst was adapted to provide a measure of the thermal decompn. rate of ClONO₂ in an N₂/O₂ gas mixt. and, in a related way, provide the abs. concn. of ClONO₂ in a flowing gas stream. Results were obtained at 353-413 K and 66-160 torr. The data is best fit by the expression $10^{-6.16} \exp(-90.7 \text{ kJ/mol/RT}) \text{ cm}^3/\text{s-mol.}$, which agrees with earlier results. When combined with the rate const. for the assocn. reaction of ClO with NO₂, these results yield a larger **equil.** const. for the reaction than indicated in previous direct measurements. A value for $\Delta H^\circ_f 289.15$ for ClONO₂ of 22.9 kJ/mol is obtained from a 3rd-law thermochem. anal. of the data.

L25 ANSWER 182 OF 325 CA COPYRIGHT 2003 ACS
AN 103:75494 CA
TI Response of **chemiluminescence NOx analyzers** and **ultraviolet ozone analyzers** to organic air pollutants
AU Grosjean, Daniel; Harrison, Jeffrey
CS Daniel Grosjean and Associates, Inc., Camarillo, CA, 93010, USA
SO Environmental Science and Technology (1985), 19(9), 862-5
AB A **chemiluminescent NOx analyzer** and an **UV photometry O₃ analyzer** responded to a no. of org. pollutants and mixts. in purified air. Two types of

interferences were obsd. with the **NOx analyzer**. A small pos. interference as NO was obsd. with organosulfur compds. Pos. interferences as **NO2** were obsd. with HNO₃, Me nitrate [598-58-3], peroxyacetyl nitrate [2278-22-0], N₂O₅ (in **O3-NO2** mixts. in the dark), certain nitroaroms. (2-methyl-4-nitrophenol (I) [99-53-6] and Cl-contg. compds. (ClNO_x), but not with peroxybenzoyl nitrate. The **UV photometry O3 analyzer** gave a pos. response to **O3-free** atmospheres contg. arom. compds. including styrene [100-42-5], trans- β -methylstyrene [873-66-5], o-cresol [95-48-7], and I. Since many arom. compds. absorb light at ~254 nm, methods other than **UV photometry** should be employed to **measure ozone** in atmospheres contg. these aroms.

~~L25~~ ANSWER 204 OF 325 CA COPYRIGHT 2003 ACS
AN 98:184863 CA
TI **Chemiluminescence** analysis of air for pollutant determination
PA Shimadzu Seisakusho Ltd., Japan
SO Jpn. Tokkyo Koho, 5 pp.
PI JP 57053529 B4 19821113 JP 1975-125093 19751017
PRAI JP 1975-125093 19751017

AB **O3** and a sample gas mixt. is **irradiated** with **UV** light beam to measure the **chemiluminescence** resulted from the reaction of O and the reactive components in the sample gas. The method can be used for **NO2** and SO₂ **detn.**

L25 ANSWER 211 OF 325 CA COPYRIGHT 2003 ACS
AN 97:41948 CA
TI Direct **measurements** of **ozone** and **nitrogen dioxide photolysis** rates in the troposphere
AU Dickerson, Russell R.; Stedman, Donald H.; Delany, Anthony C.
CS Natl. Cent. Atmosp. Res., Boulder, CO, 80307, USA
SO Journal of Geophysical Research, C: Oceans and Atmospheres (1982), 87(C7), 4933-6
AB Direct **measurements** of the rate of **O3 photolysis** to O₂(1 Δ g) and O(1D) and of **NO2 photolysis** to NO and O(3P) are reported as **photolysis** frequencies j(**O3**) and j(**NO2**). The effects of solar zenith angle, total **O3** column, cloud cover, aerosol loading, temp., pressure, and altitude are examd. For a clear sky, 0 albedo, and zenith angle 0-65°, the expression j(**NO2**) is calcd. and gives **NO2 photolysis** frequencies (**photolysis** rates per unit reactant) to within ~10% of the measured values. Pressure has no **measurable** effect on j(**NO2**) between 0.15 and 1.2 bars. Temp. has only a small effect at 230-400 K, which can be described in terms of an effective activation energy of ~0.48 kJ/mol. Frequencies of **O3 photolysis** to O(1D) depend strongly on overhead **O3** column and temp. as well as zenith angle; for 300 K, a clear sky, 0 albedo, 45° zenith angle, 0.345-cm **O3** column, and altitude between 1.6 and 6 km, j(**O3**) = 1.6 (\pm 0.25) \times 10⁻⁵/s. Measured **photolysis** frequencies show only weak dependence on altitude and aerosol loading. Clouds dramatically reduce both **photolysis** frequencies, but they reduce the total radiation by a significantly larger factor. Airborne **UV** radiometers, calibrated against direct **measurements** of j(**NO2**), were used to **measure** albedos of many surfaces. Whereas natural surfaces such as vegetation and oceans have albedos near zero, dense clouds and snow have an albedo of ~1. With increasing altitude, mol. and particulate scattering often increase the effective albedo with respect to **photolysis** frequencies.

L25 ANSWER 212 OF 325 CA COPYRIGHT 2003 ACS
AN 97:27858 CA
TI **Ozone precursor monitor** (OPM) for investigating air pollution
AU Ortman, Gordon C.
CS Off. Res. Dev., EPA, Research Triangle Park, NC, 27711, USA
SO Analysis Instrumentation (Research Triangle Park, North Carolina) (1982),

20, 65-84

AB A new automated method and a monitoring system were developed for **quant. detn.** of O3 precursors (e.g.; hydrocarbons, NO, and NO2) in the lower atm. In this system, an **O3 analyzer** is coupled to reaction vessels contained in an **irradn.** chamber. At timed intervals, discrete samples of outside air are drawn into the reaction vessel and **irradiated** with UV light. The amt. of O3 produced is a **measure** of the photochem. reactivity potential of the precursor blend. The title monitor is designed for urban air sampling stations where analyzers for the principal air pollutants are routinely operated. However, it is suitable for forecasting elevated O3 concns., **assessing** the photoreactivity of solvents, and investigating the transport of O3 precursors from urban to rural areas.

L25 ANSWER 214 OF 325 CA COPYRIGHT 2003 ACS

AN 96:204650 CA

TI Measurements by airplane of the distribution of ozone and primary air pollutants

AU Van Duuren, H.; Roemer, F. G.; Diederer, H. S. M. A.; Guicherit, R.; Van den Hout, K. D.

CS Environ. Res. Dep., N. V. Kema, Arnhem, Neth.

SO Comm. Eur. Communities, [Rep.] EUR (1982), EUR 7624, Phys.-Chem. Behav. Atmos. Pollut., 460-8

AB A study of atm. horizontal and vertical O3 distribution and plume photochem. reactions in the Netherlands found that O3 concns. are higher in the mixing layer than in ambient air, due to photochem. processes of precursors. Localized controls of precursor emissions do not effectively reduce O3 levels and, because of reduced NO quenching, could increase O3 concns. near the source. Regional or larger scale regulatory actions are necessary for redn. of O3 levels.

L25 ANSWER 216 OF 325 CA COPYRIGHT 2003 ACS

AN 96:128651 CA

TI Direct **measurement** of j(NO2) and j(O3) by **chemiluminescence**

AU Dickerson, Russell R.; Watt, William W.

CS Univ. Michigan, Ann Arbor, MI, USA

SO CHON Photochem. Troposphere, Notes Colloq. (1980), Issue NCAR/CQ-7+1980-ASP, 28-48 Publisher: Natl. Cent. Atmos. Res., Boulder, Colo.

AB The chem. and engineering are discussed of flow actinometers for O3 and NO2 which are used to **measure** their **photolysis** rates directly. The use of specific electronic UV radiometers which give response directly related to **photolysis** rates is discussed also.

L25 ANSWER 224 OF 325 CA COPYRIGHT 2003 ACS

AN 95:52568 CA

TI Modulated photolysis of the **ozone**-water vapor system: kinetics of the reaction of hydroxyl radical with perhydroxyl radical

AU Burrows, J. P.; Cox, R. A.; Derwent, R. G.

CS Environ. Med. Sci. Div., AERE, Harwell/Oxon., OX11 0RA, UK

SO Journal of Photochemistry (1981), 16(2), 147-68

AB The mol. modulation technique was employed to observe the kinetic behavior of OH and HO2 radicals in the 253.7 nm photolysis of O3-H2O-O2-N2 (or O3-H2O-O2-He) mixts. at 1 atm pressure. The radicals were **monitored** by absorption at 308.2 nm and 210 nm, resp. The rate coeff. for the reaction OH + HO2 → H2O + O2 was (detd. by computer simulation) $k_6 = (6.2 \pm 4.0/2.0) \times 10^{-11}$ cm³/mol-s, independent of temp. in the range 288-348 K. The possible role of HOx complexes in this reaction is discussed.

L25 ANSWER 254 OF 325 CA COPYRIGHT 2003 ACS

AN 88:141099 CA
TI The vertical distribution of ozone in the atmospheric boundary layer
AU Van Dop, H.; Guicherit, R.
CS R. Netherlands Meteorol. Inst., De Bilt, Neth.
SO Proc. Int. Clean Air Congr., 4th (1977), 515-19. Editor(s): Kasuga, Susumu; Suzuki, Noboru; Yamada, T. Publisher: Jap. Union Air Pollut. Prev. Assoc., Tokyo, Japan.
AB Galvanic monitors were used in aircraft measurements of O3 concns. at 3 heights on a meteorol. mast. O3 concns. increased with height at ≤ 500 m and at > 2000 m, the mean O3 concns. scarcely varied with height until the tropopause was reached. The relatively low O3 values near the surface on days when photochem. processes are occurring are caused by deposition on the surface and chem. destruction by primary pollutants. Surface O3 concns. are not representative for O3 content of the boundary layer.

L25 ANSWER 263 OF 325 CA COPYRIGHT 2003 ACS

AN 87:106013 CA
TI A balloon radioprobe for **measuring** the stratospheric **nitrogen oxide** distribution
AU Fabian, P.; Matthews, A.; Tiefenau, H.
CS Inst. Stratosphaerenphys., Max-Planck-Inst. Aeron., Lindau, Fed. Rep. Ger.
SO Symp.: Forsch. Ballonen, [Ber.] (1976), Meeting Date 1974, 145-55
Publisher: Max-Planck-Inst. Phys. Astrophys. Inst. Extraterr. Phys., Garching, Ger.
LA German
AB The vertical NO profile in the atm. was measured by a balloon radioprobe at a 30 km height. NO in air is contacted with O3 to form NO2 and the **equil.** between NO and NO2 is established by the photodissocn. of NO2.

L25 ANSWER 266 OF 325 CA COPYRIGHT 2003 ACS

AN 87:42163 CA
TI Some measurements of the vertical distributioo of ozone in the atmospheric boundary layer
AU Van Dop, H.; Guicherit, R.; Lanting, R. W.
CS R. Netherlands Meteorol. Inst., De Bilt, Neth.
SO Atmospheric Environment (1967-1989) (1977), 11(1), 65-71
AB Vertical profile measurements of O3 were made up to 3000 m from an aircraft and up to 200 m from a meteorol. mast. The flights showed an O3 max. of 190-440 $\mu\text{g}/\text{m}^3$ and an upper air inversion at 700-2000 m above which the O3 concn. decreased sharply. The mast measurements showed that O3 concns. increased with height. O3 fluxes, eddy diffusivities, and deposition velocities were estd.

L25 ANSWER 270 OF 325 CA COPYRIGHT 2003 ACS

AN 86:160265 CA
TI Use of automatic devices for recording and collecting information on air pollution
AU Zaitsev, A. S.; Vol'berg, N. Sh.
CS Gl. Geofiz. Obs. im. Voeikova, Leningrad, USSR
SO Probl. Kontrolya Obespecheniya Chist. Atmos., Sb. Dokl. Vses. Semin. VDNKh (1975), Meeting Date 1973, 76-84. Editor(s): Berlyand, M. E. Publisher: Gidrometeoizdat, Leningrad, USSR.
AB The **detn.** of SO2, CO, NO2, O3, hydrocarbons, Cl, etc., by photocolorimetry, conductometry, coulombetry, chromatog., flame ionization, flame photometry, **chemiluminescence**, IR, UV, Raman dispersion, Fourier spectrometry, and optical-acoustic methods is discussed. Correlational, spectral, and structural functions can be calcd. using computer algorithms, as well as small variations of pollutants with space and time. The analyzers give new

qual. data on the behavior of CO and SO₂ in city air and on meteorol. effects on pollution control.

L25 ANSWER 279 OF 325 CA COPYRIGHT 2003 ACS
AN 84:49302 CA
TI Gas phase **analyzers** for **ozone** and **nitrogen oxides**
AU Taylor, M. V.; Shahinian, G. L.
CS California Air Resour. Board, Sacramento, CA, USA
SO Conf. Methods Air Pollut. Ind. Hyg. Stud., Plenary Sess., 13th (1973), Meeting Date 1972, No. 10, 5 pp. Publisher: Air Ind. Hyg. Lab. Calif. State Dep. Public Health, Berkeley, Calif.
AB A review with 14 refs. A brief description of **uv** and **chemiluminescence** instruments used to **monitor** O₃ [10028-15-6] and NO_x [11104-93-1] in air.

L25 ANSWER 298 OF 325 CA COPYRIGHT 2003 ACS
AN 78:88327 CA
TI Conversion of **nitrogen dioxide** to **nitric oxide** for subsequent **determination** by **ozone chemiluminescence** reaction
IN Neti, Radhakrishna Murty; Rocks, Raymond Ewalt
PA Beckmann Instruments, Inc.
SO Ger. Offen., 9 pp.
PI DE 2231459 A1 19730118 DE 1972-2231459 19720627
US 3840342 A 19741008 US 1971-159470 19710702
PRAI US 1971-159470 19710702
AB NO₂ impurities in air were converted to NO by **uv irradiation** at 1849-6600 Å and 130°. The method prevented the oxidn. of NH₃ to NO occurring in the catalytic decompn. of NO₂. Thus, air contg. 1.5 ppm NO₂ was **irradiated** as above to give complete decompn. of NO₂.

L25 ANSWER 299 OF 325 CA COPYRIGHT 2003 ACS
AN 78:7421 CA
TI Indirect **determination** of **nitrogen oxides** by a **chemiluminescence** technique
AU Guicherit, R.
CS Res. Inst. Public Health Eng., TNO, Delft, Neth.
SO Atmospheric Environment (1967-1989) (1972), 6(11), 807-14
AB NO₂ concns. in outdoor air can be **detd.** indirectly by **measuring** the **equil. ozone** concn. under continuous **uv irradiation**. This concn. can be measured very accurately by a **chemiluminescence** technique using Rhodamine B as a light emitting compd. The **equil. ozone** concn. on **photolysis** of the NO₂ present is a function of the wavelength, the light intensity, and the temp. By keeping these parameters const., NO₂ concns. can be **detd.** very accurately with a lower **detection** limit of 5 µg NO₂ m⁻³ air.

L25 ANSWER 308 OF 325 CA COPYRIGHT 2003 ACS
AN 76:17505 CA
TI Ozone analysis by chemiluminescence measurement
AU Guicherit, R.
CS Atmos. Pollut. Div., Res. Inst. Public Health Eng. T.N.O., Delft, Neth.
SO Fresenius' Zeitschrift fuer Analytische Chemie (1971), 256(3), 177-82
AB The O₃ concn. in ambient air was **detd.** continuously by measuring the light emitted by the luminescent reaction of O₃ with Rhodamine B. The stability of the light emission was increased by addn. of gallic acid, which protects the dye by reacting more easily with O₃. An intermittent sampling procedure was used to increase the stability of chemiluminescent surface and to check the stability of the zero point of the detection system. Each min, O₃-contg. air was introduced into the reaction chamber for ~15 sec and then O₃-free air for ~45 sec. The decrease of sensitivity of the chemiluminescent surface by adsorbed moisture was prevented by coating the

surface with a hydrophobic coating and by controlling the relative humidity of the O₃-free air. NO₂, Cl₂, SO₂, H₂S, NH₃, HCl, H₂O₂, and HF, at concns. ≤2 ppm did not interfere. For a flow of 400 ml/min, the calibration curve was linear for 20-2200 μg O₃/m³. The detection limit was <0.1 × 10⁻³ μg O₃/m³ and the deviation was ≤5%.

L25 ANSWER 310 OF 325 CA COPYRIGHT 2003 ACS

AN 75:144287 CA

TI Measurements of rate constants for termolecular reactions of O(3P) with nitric oxide, molecular oxygen, carbon monoxide, molecular nitrogen and carbon dioxide using a pulsed vacuum-uv photolysis-chemiluminescent method
AU Stuhl, F.; Niki, H.

CS Sci. Res. Staff, Ford Mot. Co., Dearborn, MI, USA

SO Journal of Chemical Physics (1971), 55(8), 3943-53

AB Abs. rate consts. for a no. of termol. reactions of O atoms were detd. at 300°K. O atoms were generated by pulsed vacuum-uv photolyses of NO, O₂, CO₂, and N₂O and were monitored by NO₂* or CO₂* chemiluminescent emission. The rate consts. k, in units of cm⁶ mol.⁻² sec⁻¹, for the following reactions are: O + NO + NO → NO₂ + NO, k = 1.5 × 10⁻³¹; O + NO + He → NO₂ + He, k = 6.65 × 10⁻³²; O + O₂ + O₂ → O₃ + O₂, k = 6.4 × 10⁻³⁴; O + O₂ + N₂ → O₃ + N₂, k = 5.4 × 10⁻³⁴; O + O₂ + CO → O₃ + CO, k = 6.7 × 10⁻³⁴; O + CO + CO → CO₂ + CO, k = 3.2 × 10⁻³⁶; O + CO + N₂ → CO₂ + N₂, k = 2.2 × 10⁻³⁶; O + CO + He → CO₂ + He, k = 1.7 × 10⁻³⁶; O + CO₂ + CO → CO₃ + CO, k < 9 × 10⁻³⁶; and O + N₂ + N₂ → N₂O + N₂, k < 5 × 10⁻³⁸.

L25 ANSWER 315 OF 325 CA COPYRIGHT 2003 ACS

AN 71:128298 CA

TI Atmospheric photochemical reactions in a tube flow reactor
AU Stephens, Edgar R.; Price, Monty A.

CS Univ. of California, Riverside, CA, USA

SO Atmospheric Environment (1967-1989) (1969), 3(5), 573-82

AB The complexities of atm. chemistry lead to the expectation that changes in the nature and not just in the amt. of photochem. smog will result from the current program for controlling hydrocarbon emissions. When the amt. of reactive hydrocarbon is no longer sufficient to convert all the NO to products, marked decreases in most smog symptoms should be observed, but there may also be an appreciable increase in NO₂ exposure. These changes were studied in a transparent flow reactor using artificial uv irradiation. The output of O₃ and peroxyacetyl nitrate decreased sharply when the amt. of hydrocarbon used was not sufficient to convert all the input NO to NO₂. The N compds. detected in the output (NO, NO₂, peroxyacetyl nitrate, and trace amts. of alkyl nitrate) fell short of accounting for all the NO in the input. Each mol. of propylene or cis-2-butene consumed caused, at max., about 2 moles of NO to be converted to NO₂.

=> log y

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